NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, DC 20594

September 17, 2013

Data Recorder Factual Report

Specialist's Factual Report
By Christopher Babcock

1. EVENT

Location:	Intracoastal City, Louisiana
Date:	October 5, 2012, 0758 Central Daylight Time
Operators:	Bristow Helicopters
NTSB Number:	CEN13FA003

2. GROUP

A group was not convened.

3. SUMMARY

On October 5, 2012, at about 0758 central daylight time (CDT), a Bell Helicopter, registration N406AL and operated by Bristow US, was substantially damaged when it collided with terrain shortly after takeoff from Central Industries Airport near Intracoastal City, LA. The commercially rate pilot was fatally injured. The helicopter was operated under the provisions of Title 14 Code of Federal Regulations Part 91 on a company flight plan. Instrument meteorological conditions prevailed during the post-maintenance test flight.

An Appareo GAU2000 unit was recovered from the helicopter and forwarded to the National Transportation Safety Board's Vehicle Recorder Laboratory for evaluation.

4. DETAILS OF INVESTIGATION

On October 17, 2012, the NTSB Vehicle Recorder Laboratory received the following equipment:

Recorder Manufacturer/Model:	**Appareo GAU2000/RMS2000**
Recorder Serial Number:	**184**

4.1. Recorder Description

The Appareo GAU2000 is a crash hardened self-contained flight data recording device. The system consisted of a detached SD memory card storage unit, an internal GPS receiver and an internal attitude reference unit. The unit records data at a rate of approximately 4 Hz on both the SD card (if a memory card is installed in the memory card storage unit) and the non-volatile memory module located internal to the GAU2000

unit. The internal memory can hold approximately 200 hours of flight data. Every power up cycle of the unit generates a new data file corresponding to that flight's data.

4.2. Recorder Conditions

The recorder was damaged by impact forces. The condition of the RMS2000 SD memory card storage unit is shown in Figures 1 & 2. The crash-hardened unit and Flash memory device extracted from the hardened housing are shown in Figures 3 & 4.

Figure 1. RMS2000 SD card storage unit.

Figure 2. SD card location.

Figure 3. Crash-hardened unit.

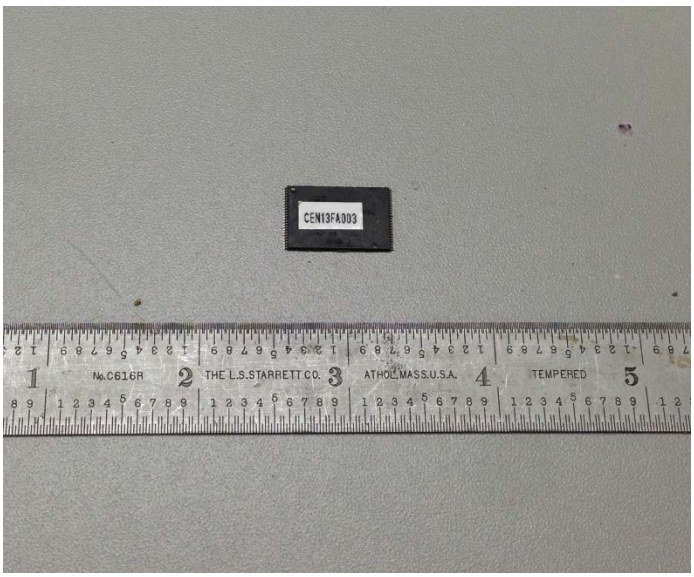

Figure 4. Flash memory device.

4.1. Contents of Recording

The SD card contained records from the accident flight and the previous 98 power cycles. The accident flight file was approximately 6 minutes long with a flight segment of approximately 2 minutes. Figure 5 shows the recorded flight data for the accident flight. Figure 6 shows recorded flight data over the last 2 minutes of the accident flight. Figure 7 shows the flight track overlaid on aerial imagery.

The data for the accident flight began at 7:52:43 CDT. The helicopter stayed nearly static until approximately 7:57 when it began a hover taxi to the northeast. The helicopter turned northward and then westward and began increasing altitude at 7:57:55. The aircraft reached its maximum altitude of 255 feet and ground speed of 51 knots at about 7:58:15. At this time the aircraft began rolling to the left and descending. The final data point was recorded at 7:58:30 with the aircraft at 37 feet altitude, rolled approximately 20 degrees to the left and pitched 17 degrees nose down.

The last data point was located approximately 100 feet from the accident site. The Flash memory device (Figure 4) was removed from the unit and a bit-for-bit image was downloaded using a chip reader to determine if any additional flight data was present on the Flash chip and not transmitted to the SD card. No additional flight data was found.

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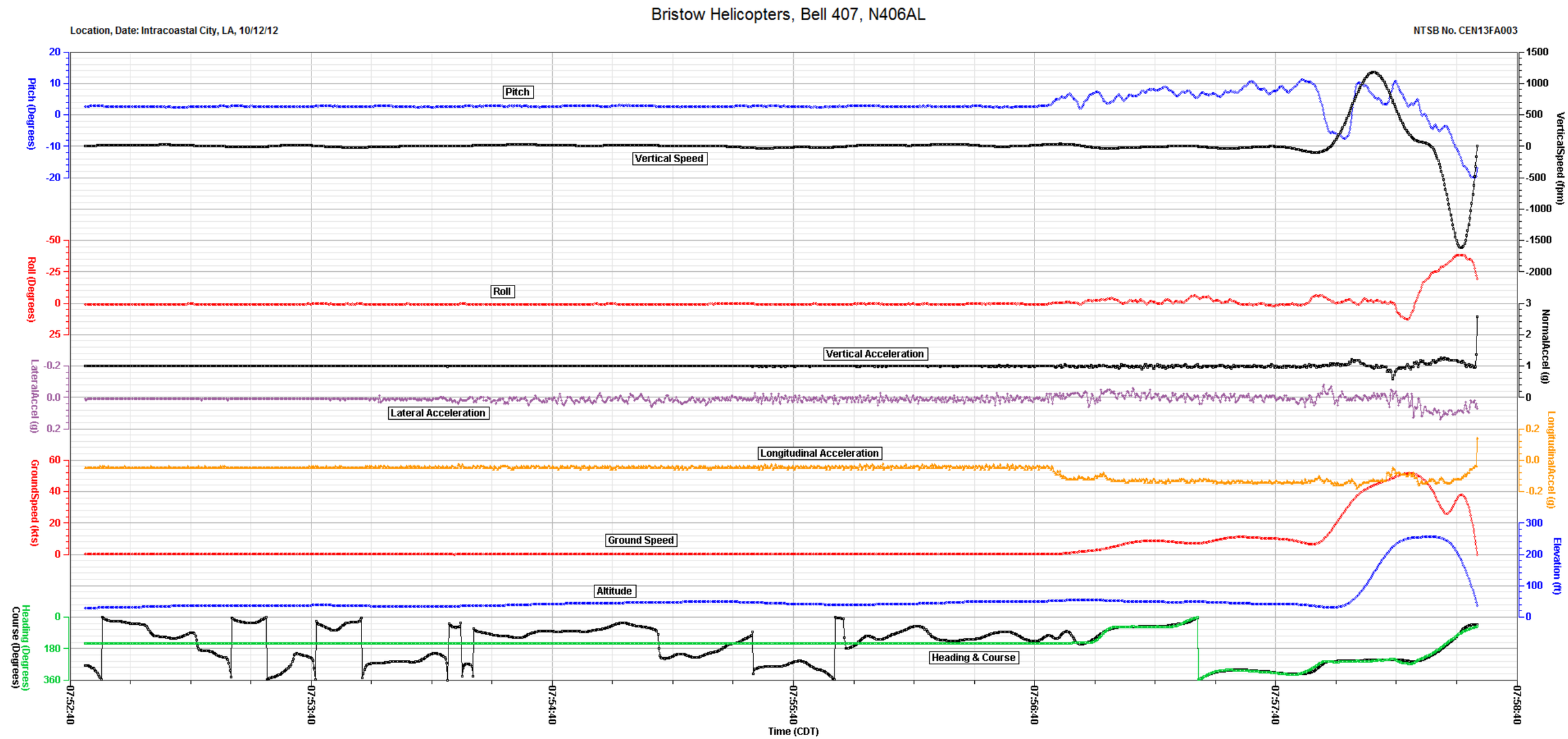

Figure 5. Recorded flight data from entire accident flight.

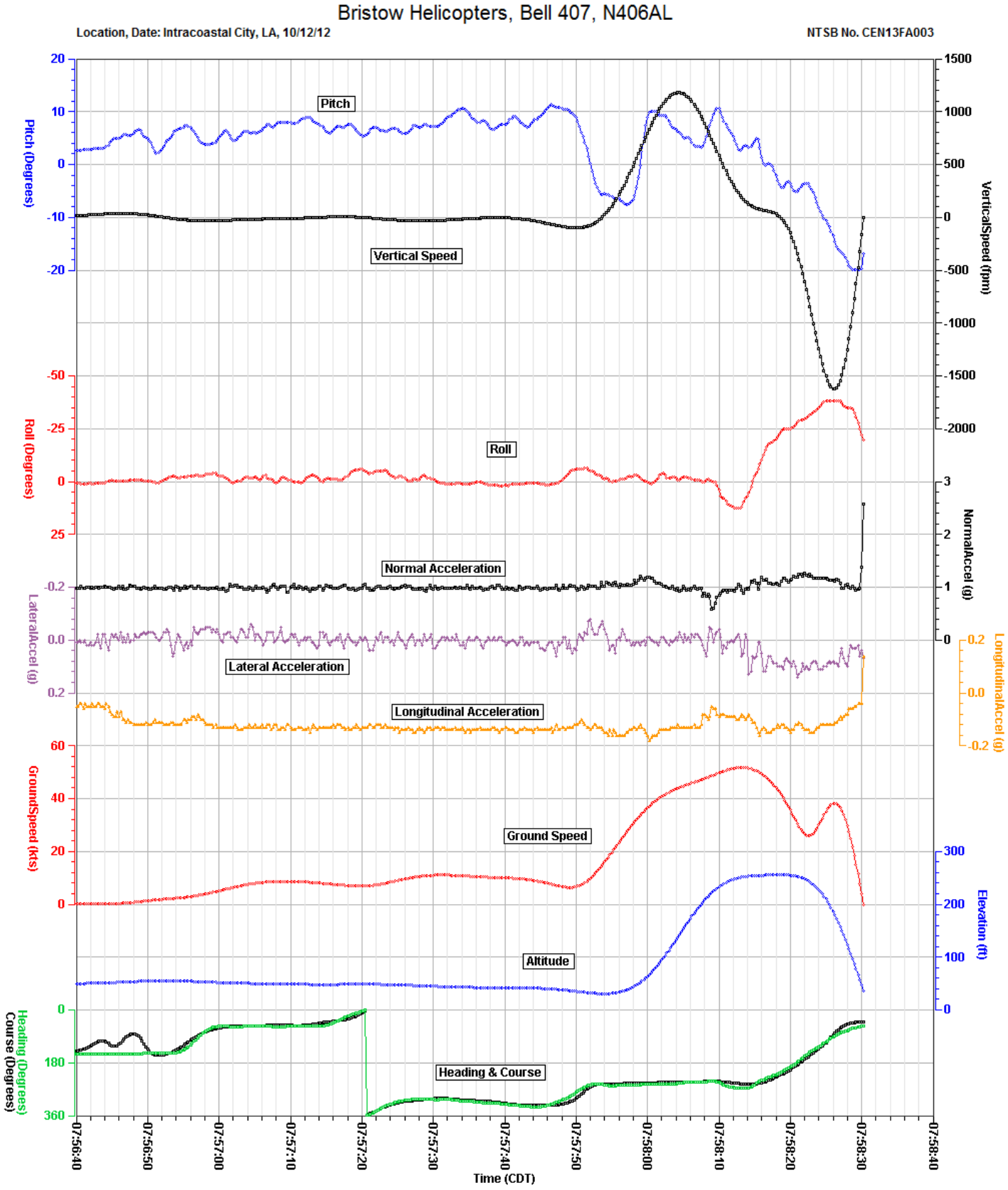

Figure 6. Recorded flight data from last 2 minutes of accident flight.

Figure 7. Accident flight track overlaid on aerial imagery.

APPENDIX A

Table A-1. Verified and provided data recorder parameters. Parameters are named based on Appareo specifications.

Parameter Name	Parameter Description
Elevation (ft)	GPS Altitude
LongitudinalAcceleration (g)	Longitudinal Acceleration
NormalAcceleration (g)	Vertical Acceleration
LateralAcceleration (g)	Lateral Acceleration
Latitude (deg)	GPS Latitude
Longitude (deg)	GPS Longitude
GroundSpeed (kts)	GPS Ground Speed
Heading (degrees)	True Heading
Course (degrees)	True Course
VerticalSpeed (fpm)	Vertical Speed
Pitch (degrees)	Pitch Attitude
Roll (degrees)	Roll Attitude